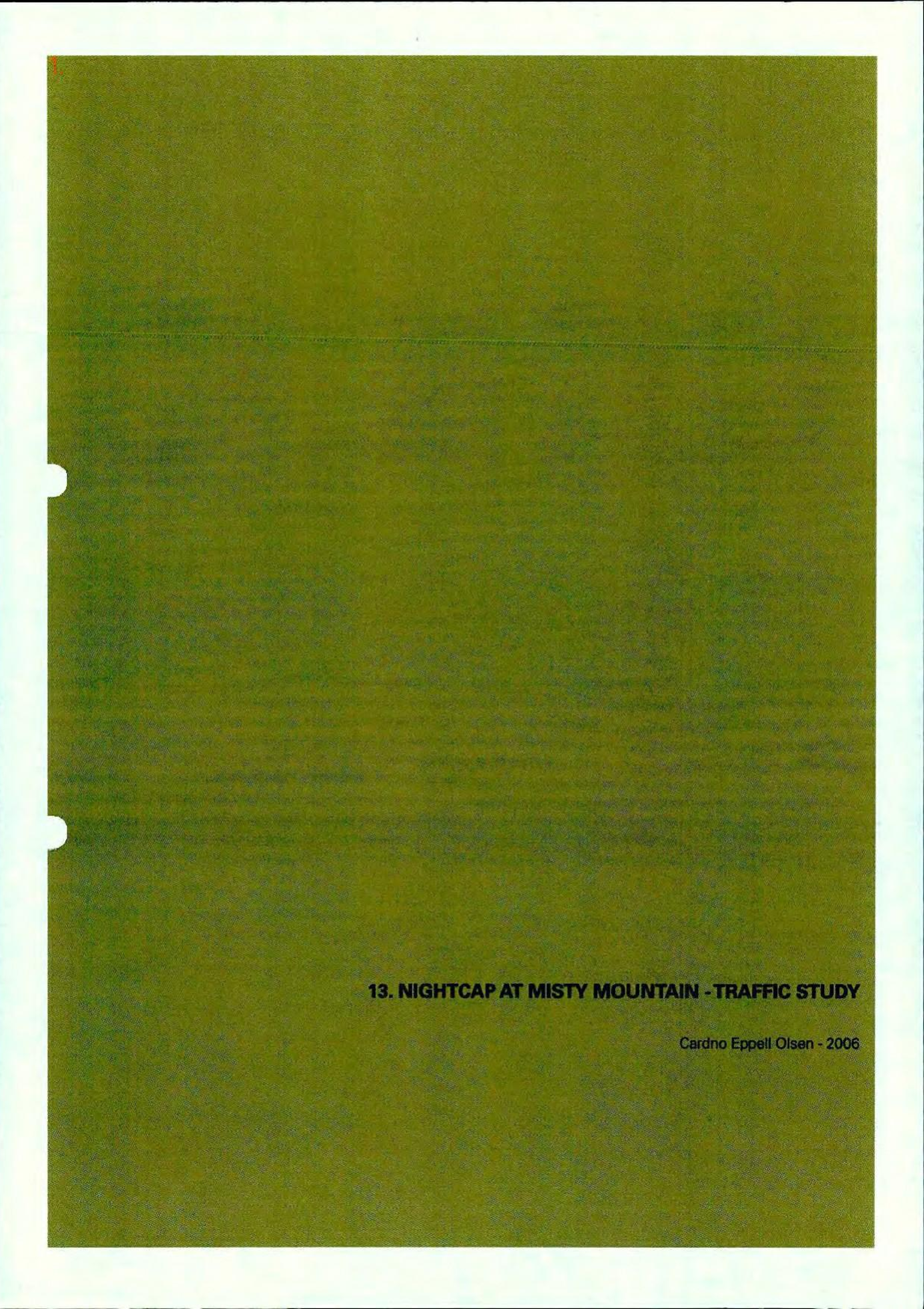


13. NIGHTCAP AT MISTY MOUNTAIN - TRAFFIC STUDY

Cardno Eppell Olsen - 2006

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Nightcap at Misty Mountain –Traffic Study

Prepared for Nightcap Village

June 2006



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EXECUTIVE SUMMARY

This traffic report documents the traffic impacts of a master planned village community proposed near Kunghur, 10km west of Uki. It is the intention that the village will support a peak population of approximately 2,000 people (residents and visitors). The village is to accommodate 800 – 1,000 residents and will include the following uses (note that the quantum/size of facilities is indicative at this stage):

- 210 detached residential dwellings;
- 90 residential units;
- 120 townhouses;
- 700sq.m light industrial workshops;
- 1,000sq.m retail area including restaurants/cafes;
- 1,500sq.m conference centre;
- hotel with 100 guest capacity;
- backpacker hostel with 100 guest capacity;
- health/recreation facilities.

The development proposes access to the Kyogle Road via two unsignalised intersections (one existing opposite Mebbin Springs and one new junction 150 – 200m east of here). The traffic analysis indicates that both junctions will operate acceptably with full development traffic beyond a 2027 horizon.

Whilst the assessment considers an unsignalised T junction at the western site access (opposite the Mebbin Spings access) it is recommended that a more desirable form would be a roundabout at this location on Kyogle Road. The roundabout would incorporate this western access plus the Mebbin Springs access. The advantage of the roundabout is that it would:

- accommodate turning traffic to both the subject site and Mebbin Springs;
- signify the existence of the village on this section of Kyogle Road;
- reduce traffic speed on Kyogle Road adjacent to and approaching the village site.

Given the form of Kyogle Road approaching the site from both the east and west and the proposed development of the village, it is recommended that a slower speed limit be incorporated on Kyogle Road. This speed limit is recommended at 80km/h on the approaches towards the village (e.g. 1-2km in either direction) and as low as 60km/h directly adjacent to the village (on Kyogle Road). The recommended roundabout would support this reduced speed limit.

The development will introduce approximately 4,500vpd onto the adjacent road system (Kyogle Road) which currently carries approximately 1,200vpd near the site.

An assessment has been made of the traffic aspects of the development using the following Tweed Shire Council codes and policies:

- Development and Control Plan No. 2 – Site Access and Parking Code (1999 version);
- Development and Control Plan No. 6 – Multi-Dwelling Housing (2001 version);
- Development and Control Plan No. 16 – Subdivision Manual (2003 version);
- Tweed Road Contribution Plan CP no. 4, Version 4.8 (TRCP).

The initial application is to subdivide the site into three 'management' lots. Subsequent stages will involve the development of the various land uses within strata title schemes within each of these management lots. Using the Tweed Road Contribution Plan (TRCP) the approximate contribution to external transport infrastructure by the subject application (ie. three management lots) will be $32,474.93 (4.5vpd per household x 3 lots x $2,405.55). At the time of any subsequent applications for each of the development stages, TRCP payments will be necessary recognising that there may be credits applicable to cover the cost of provision (by the developer) of the local street network within the development site. This mechanism will ensure that significant contributions to the TRCP are made as each development stage is approved.

The village site is proposed to comprise a number of strata title schemes within each of the management lots. To encourage the village atmosphere, parking and traffic within the village centre is to be discouraged. The parking provision on site is to be a combination of public parking areas (communal), public on street parking and private off street parking. The aim is to encourage visitors to park in the public (communal) areas and walk to and within the village.



Whilst the individual parking requirements will be finalised as part of each application, the intent is to ensure that the overall quantum satisfies the public demand and Council's planning requirements. To this end, we believe the appropriate minimum provision to satisfy the development mix/quantum assumed herein is as follows:

- 235 public car spaces (see below);
- 1 space on site for each residential lot;
- 1 space on site for each residential unit;
- 1 space on site for each townhouse;
- 50 guest spaces on site for the hotel (see below);
- 50 guest spaces on site for the convention centre (see below);
- 20 guest spaces on site for the backpackers.

Given the cross usage of facilities on site it is suggested that the hotel and convention centre parking could be reduced by up to 50%. Similarly, the public (communal) car parking of 235 spaces could be reduced by up to 20%.

The street network within the site will comprise a number of public roadways providing connection between Kyogle Road and the management lots (as part of the initial application). With development of the strata title schemes in subsequent stages, a number of private roadways will be developed. Some additional public roadways may also be required in these subsequent stages. Within the village site the speed limit is intended to be no greater than 40km/h.

As part of the initial application for the management lots the following road cross sections are proposed in accordance with Council's standards for road design:

- neighbourhood connector street – 11m wide pavement (maximum) within an 18m wide road reserve – to connect from each access point on Kyogle Road to the central village connector street;
- central village connector street – 9m wide pavement (maximum) within a 17m wide road reserve – the east west connector street through the village centre connecting between each of the neighbourhood connector streets;
- access street – 7.5m wide pavement (maximum) within a 14.5m wide road reserve – to connect from the central village connector street beyond the western boundary of the site.



A significant network of pedestrian and bicycle pathways is proposed throughout the entire site. This network provides connections within and between the management lots. The network provides easy pedestrian connections between all proposed sites and the village centre and between the main entry car park (and other car parks) and the village centre. This network is considered appropriate and desirable to meet the non motorised mobility needs of the development and will facilitate the village objective of minimising car usage.

An assessment of the form of intersections on Kyogle Road has indicated that unsignalised T junctions with appropriate turning lanes on Kyogle Road are suitable. Nonetheless, a roundabout is the recommended treatment at the western access intersection (as discussed earlier). Sight distance to/from each access location has been checked and would meet the appropriate criteria subject to some vegetation clearing on the site and within the road reserve

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1.0 INTRODUCTION

Cardno Eppell Olsen has been commissioned to undertake a traffic assessment to accompany a master plan application for a proposed village named "Nightcap at Misty Mountain" at a site near Kunghur (near Uki) in the Nightcap Range of Northern New South Wales.

The overall master plan adopted for the proposal is to develop a self-contained sustainable village for approximately 800 – 1,000 residents. It is the intention that the village will support a peak population of approximately 2,000 people (residents and visitors). The site is situated in the Tweed Valley, bounded by the National Parks of Nightcap and Border Ranges and the Tweed River, and is serviced by Kyogle Road along the southern boundary. The nearest township is Uki, approximately 10km east along Kyogle Road.

The objective of this assessment is to evaluate the impact of traffic generated by the village, both internal an external to the village. This includes consideration of appropriate infrastructure contribution, intersection analysis and the required parking spaces.

The assessment has been undertaken with information provided by the applicant and Tweed Shire Council. Relevant Codes and polices have been used from the following:

- Development and Control Plan No. 2 – Site Access and Parking Code (1999 version);
- Development and Control Plan No. 6 – Multi-Dwelling Housing (2001 version);
- Development and Control Plan No. 16 – Subdivision Manual (2003 version);
- Tweed Road Contribution Plan CP no. 4, Version 4.8 (TRCP).

The broad methodology for the assessment has been to identify the likely traffic generation for the development components and assess the required road network form. The subject application is to subdivide the site into three 'management' lots. In this regard the appropriate financial contribution to road infrastructure (under the TRCP) has been identified.

Parking requirements are calculated for the overall development according to the Tweed Shire Council 'Site Access and Parking Code, 1999'. However, as discussed within the reports, the parking provisions for the overall site will represent a mixture of individual site parking and communal (or village) parking.

2.0 PROPOSED DEVELOPMENT

The development application is for a Concept Proposal and Integrated Development comprising residential housing, commercial units, recreation and conference/teaching facilities. The initial application is to reconfigure the site to create three 'management' lots. Subsequent to this the proposed master plan will be developed in a series of strata title schemes. Whilst the master plan is flexible in its detail, the current proposal intends to construct the following:

- 210 detached residential dwellings;
- 90 residential units;
- 120 townhouses;
- 700sq.m light industrial workshops;
- 1,000sq.m retail area including restaurants/cafes;
- 1,500sq.m conference centre;
- hotel with 100 guest capacity
- backpacker hostel with 100 guest capacity
- health/recreation facilities

The village development layout is shown on the master plan at Appendix A.

The proposed vehicular and traffic arrangements for the development are relatively unique and have been developed by the planning team to maximise the "village" atmosphere within the development. The proposal is for the majority of non essential and non residential traffic to park at the front of the development site and walk into the village. This is to occur via a main car park adjacent to Kyogle Road with pedestrian connection (bridge and pathways) between the car park and the village.

The objective of this design philosophy is to minimise vehicular traffic within the village and enhance the streetscape for pedestrian use.

In line with this design/planning objective most parts of the village development will be strata titled. In these areas, all roads will be owned and managed by the body corporate. A number of public owned roads are proposed to connect the three management lots to Kyogle Road.

2.1 Proposed Access

Two entrances are proposed on Kyogle Road to access the village (see Appendix B).

The main access (referred herein as Access A or Western Access) is via the existing unsignalised T-junction on Kyogle Road approximately 50m west of the existing access to Mebbin Springs (on the southern side of Kyogle Road). This is shown by the concept drawing number 8413 – 104 at Appendix B. Whilst the unsignalised form can provide satisfactory capacity and operation, a four leg roundabout on Kyogle Road at this location opposite the existing access to Mebbin Springs is considered to be more appropriate and desirable solution. The roundabout concept will incorporate the access to Mebbin Springs (see concept drawing number 8413 – 105 at Appendix B). This concept is discussed further in Section 5.0.

The master plan concept incorporates a car park immediately south of the Tweed River and adjacent to this western entrance to enable visitors to park and use a path and walking bridge to access the village centre.

The second access (referred herein as Access B or Eastern Access) will be constructed 150 - 200m east of the main entrance, and will provide a more direct access to the residential areas of the village (on the northern side of the site) from Kyogle Road. This intersection will be in the form of an unsignalised T-junction.



3.0 EXISTING SITUATION

The site of the proposed village is currently vacant land. Under the Tweed Shire Environmental Plan, the site is designated as 'village'.

A rural residential development, named Mebbin Springs, of approximately 60 lots has recently been developed across the road from the proposed main entrance. This recent development is complete but no dwellings have been constructed as yet.

The current access to the village site is via an existing public roadway with an unsignalised intersection on Kyogle Road opposite Mebbin Springs and approximately 50m west of the Mebbin Springs access. This existing public roadway (unsealed) winds west and approximately 200m west of the Kyogle Road intersection a private road traverses north to the site via a bridge over the Tweed River. The existing unsealed public roadway heads west from the site to some minor rural properties and a few school camping sites.

Kyogle Road is an undivided two lane arterial road owned by the Roads and Traffic Authority (RTA). Whilst it is owned by RTA, it is considered to be a secondary road hence the roadway is within the jurisdiction/responsibility of the Tweed Shire Council. It connects the towns of Kyogle approximately 40km west of the site and Murwillumbah 20 km to the east. It passes through a number of villages and towns along the route, including Uki and Kunghur. The speed limit on Kyogle Road is unposted other than the 'open speed limit' sign. The typical speed is likely to be 80 – 100km/h on Kyogle Road adjacent to the site.

The existing intersection layout as shared by the two development sites (subject site and Mebbin Springs) is staggered and accommodates right turning lanes to each development. The current siting provides for adequate site distances in both the east and west directions.

Traffic count data for Kyogle Road in the vicinity of the area has been obtained from Tweed Shire Council. An August 2004 survey indicates a daily traffic volume of 1,214 veh/day.

4.0 DEVELOPMENT TRAFFIC GENERATION

For the assessment of the traffic generation impacts, conservatively high volumes have been assumed to ensure that any capacity deficiencies in the road network are identified. It is noted that in Section 6.0 the appropriate infrastructure contribution under the Tweed Road Contribution Plan (TRCP) is calculated based on the subject application to create three management lots.

4.1 Source of Rates

Queensland Transport's Draft Transport Assessment Guide (as documented in the Queensland Department of Main Roads' Road Planning and Design Manual) and RTA's Guide To Traffic Generating Developments are the sources of the base traffic generation rates used in this assessment. The base rates (peak hour and daily) are reported in Table 4.1.

Table 4.1 ***Traffic Generation Rates***

Land Use		Peak Hour Vehicle Trips	Daily Vehicle Trips
Residential – Lots		0.8/dwelling	8/dwelling
Residential - Units – Medium / Mixed		0.6/dwelling	6/dwelling
Residential - Units – Townhouses		0.6/dwelling	6/dwelling
Commercial – Hotel		0.4/room	4/room
Mixed Use – Workshops (1)		2/100sq.m	10/100sq.m
Mixed Use – Retail (2)	AM PM	3.69/100sq.m 12.3/100sq.m	123/100sq.m
Mixed Use – Convention Centre (3)		5/100sq.m	60/100sq.m
Mixed Use - Backpackers		0.2/bed	2/bed
Health Space		9/100sq.m	45/100sq.m
Green Space (Village Green) (4)		10/number	100
Green Space (Sports Display) (4)		10/number	100
Green Space (Market Garden) (4)		10/number	100
Car Park (5)		2/car space	20
Existing Road to Mount Warning – Camping Ground (4)		5/number	50
Existing Old Road (4)		5/number	50

Notes (for Table 4.1):

(1) based on commercial use traffic generation rates

(2) AM peak traffic generation assumed to be 30% of PM peak traffic generation

(3) based on restaurant traffic generation rates

(4) represents a nominal assumption only

(5) generation is not calculated using this rate since the generation is based on the other uses within the table

4.2 Assumptions on Rates and Distributions

A number of assumptions on traffic generation and distribution have been applied (see Table A at Appendix C for details). An internal trip generation factor provided in Table A is to remove the wholly internal traffic from the traffic volumes generated at the intersections with Kyogle Road. Similarly, allowance is made for shared purpose journeys (ie. a cross use reduction factor has been applied where trips generated by one use represent a shared use trip generated by another use).

For the purpose of intersection analysis the traffic has been assigned to the two village entrances as follows (see Table B at Appendix C for details):

- 60% via the eastern access (Access B);
- 40% via the western access (Access A);
- 70% of all traffic will head east on Kyogle Road;
- 30% of all traffic will head west on Kyogle Road.

4.3 Generated Traffic Volumes

Using the information presented in Section 3.0 and the assumptions documented in the previous sections the resultant traffic volumes at the Kyogle Road intersections are detailed in Tables 4.2 (western access as T junction), 4.3 (western access as roundabout) and 4.4 (eastern access as T Junction).

The Tables 4.2, 4.3 and 4.4 following provide a listing of traffic volumes at both intersections for the following scenarios (see worksheets at Appendix C):

A 2006 Base Traffic – without development (AM Peak);
B 2006 Base Traffic – without development (PM Peak);
C 2007 Base Traffic using a 3% yearly growth rate – without development traffic (AM Peak);
D 2007 Base Traffic using a 3% yearly growth rate – without development traffic (PM Peak);
E 2017 Base Traffic using a 3% yearly growth rate – without development traffic (AM Peak);
F 2017 Base Traffic using a 3% yearly growth rate – without development traffic (PM Peak);
G 2027 Base Traffic using a 3% yearly growth rate – without development traffic (AM Peak);
H 2027 Base Traffic using a 3% yearly growth rate – without development traffic (PM Peak);

I	Development Traffic (AM Peak);
J	Development Traffic (PM Peak);
K	2017 Base Traffic using a 3% yearly growth rate – with development traffic (AM Peak);
L	2017 Base Traffic using a 3% yearly growth rate – with development traffic (PM Peak);
M	2027 Base Traffic using a 3% yearly growth rate – with development traffic (AM Peak);
N	2027 Base Traffic using a 3% yearly growth rate – with development traffic (PM Peak).

Note that for the existing public roadway at Access A (the western access) an existing base traffic of 100vpd has been assumed. The 2027 horizon has been adopted as a ten year planning horizon from an arbitrary completion date of 2017. This is considered reasonable for planning and assessment purposes.

The Kyogle Road / Access A junction currently exists as a T junction (unsignalised) and has been assessed in this existing form. It is noted that a more desirable solution is that the intersection to be constructed as a four leg roundabout incorporating the access road to Mebbin Springs. This roundabout option has also been assessed as a single lane roundabout.

The Kyogle Road / Access B junction does not currently exist. This junction is proposed as an unsignalised T junction with auxiliary turning lanes on Kyogle Road. It is assumed that this intersection will be in full operation at the completion of the development proposed for 2017.



Table 4.2 ***Kyogle Road / Access Road A (Western) T Junction***

Direction of Traffic		**L**	**T**	**R**	**T**	**L**	**R**
Approach		**From Kyogle Road West**		**From Kyogle Road East**		**From Access Road A**	
A	Vehicles	2	95	1	41	5	2
B	Vehicles	2	41	4	95	3	1
C	Vehicles	2	98	1	42	5	2
D	Vehicles	2	42	4	98	3	1
E	Vehicles	3	127	1	55	7	3
F	Vehicles	3	55	5	127	4	1
G	Vehicles	4	165	1	72	9	4
H	Vehicles	4	72	7	165	5	1
I	Vehicles	45	68	19	43	67	29
J	Vehicles	27	41	64	41	63	27
K	Vehicles	48	195	20	98	74	32
L	Vehicles	30	96	69	168	67	28
M	Vehicles	49	233	20	115	76	33
N	Vehicles	31	113	71	206	68	28



Table 4.3 Kyogle Road / Mebbin Springs / Access Road A (Western) Roundabout

Direction of Traffic		L	T	R	L	T	R	L	T	R	L	T	R
Approach		From Kyogle Road West			From Kyogle Road East			From Access Road A			From Mebbin Springs Access		
A	Vehicles	2	95	2	1	41	1	5	1	2	2	1	4
B	Vehicles	2	41	2	3	95	4	3	1	1	1	1	2
C	Vehicles	2	98	2	1	42	1	5	1	2	2	1	4
D	Vehicles	2	42	2	3	98	4	3	1	1	1	1	2
E	Vehicles	3	127	3	1	55	1	7	1	3	3	1	5
F	Vehicles	3	55	3	4	127	5	4	1	1	1	1	3
G	Vehicles	4	165	4	1	72	1	9	1	4	4	1	7
H	Vehicles	4	72	4	5	165	7	5	1	1	1	1	4
I	Vehicles	45	68	N/A	N/A	43	19	67	N/A	29	N/A	N/A	N/A
J	Vehicles	27	41	N/A	N/A	41	64	63	N/A	27	N/A	N/A	N/A
K	Vehicles	48	195	3	1	98	20	74	1	32	3	1	5
L	Vehicles	30	96	3	4	168	69	67	1	28	1	1	3
M	Vehicles	49	233	4	1	115	20	76	1	33	4	1	7
N	Vehicles	31	113	4	5	206	71	68	1	28	1	1	4



Table 4.4 *Kyogle Road / Access Road B (Eastern) T Junction*

Direction of Traffic		L	T	R	T	L	R
Approach		From Kyogle Road West		From Kyogle Road East		From Access Road B	
A	Vehicles	N/A	100	N/A	42	N/A	N/A
B	Vehicles	N/A	44	N/A	99	N/A	N/A
C	Vehicles	N/A	103	N/A	43	N/A	N/A
D	Vehicles	N/A	45	N/A	102	N/A	N/A
E	Vehicles	N/A	131	N/A	55	N/A	N/A
F	Vehicles	N/A	57	N/A	130	N/A	N/A
G	Vehicles	N/A	170	N/A	72	N/A	N/A
H	Vehicles	N/A	75	N/A	169	N/A	N/A
I	Vehicles	68	67	29	19	100	43
J	Vehicles	41	63	96	64	95	41
K	Vehicles	68	198	29	74	100	44
L	Vehicles	41	120	96	194	95	42
M	Vehicles	68	237	29	91	100	44
N	Vehicles	41	138	96	233	95	42



5.0 ROAD NETWORK ASSESSMENT

Assessment of the village road network and its impacts on Kyogle Road intersections comprises the peak hour intersection capacity impacts and the daily volumes for both capacity and amenity. For the purpose of the assessment a traffic assignment spreadsheet has been developed. This spreadsheet incorporates the entire village development in order to identify ultimate traffic volumes generated internally and at the intersections on Kyogle Road.

Kyogle Road traffic counts have been projected to a future horizon (twenty years) to 2027 by adopting a 3% per annum linear growth rate. This is additional to the development generated traffic.

Traffic volumes within the village have been derived in the spreadsheet using generation and distribution assumptions discussed in Section 4.0. This includes all proposed village development, residential, commercial, recreational and conference facilities.

It is assumed that the proposed village will be fully developed once the current proposal is complete; hence no traffic growth rate has been applied to traffic internally generated. It has also been assumed that the development will commence in 2007 and will be staged over a 10 year period (i.e. assumed completion by 2017).

5.1 Site Access

The adopted design for access to the village from Kyogle Road is to provide a main entrance (Access A) via the existing unsignalised T junction on Kyogle Road adjacent to the Mebbin Springs access road (see drawing 8413 – 104 at Appendix B) and a second access (Access B - a T-junction with a right turn bay into the site), 150 - 200m east of the current entrance with an additional river crossing. The main access will utilise the existing river crossing into the site. The main justification for the two access points is to:

- separate the two traffic streams, residential and visitors;
- provide the residential areas with a more direct route to/from Kyogle Road. This will provide greater convenience and more efficient emergency access in case of bush fire;
- provide a temporary and separate construction access as each stage of the development is completed.

The recommended alternative form for the main access (Access A) is a roundabout on Kyogle Road (see drawing 8413 – 105 at Appendix B). The objective of this intersection form is to accommodate the potential four way (or offset T junction) with Mebbin Springs and to also create a relatively slow speed environment on Kyogle Road adjacent to the proposed village. The latter is considered to be a vital part of the village atmosphere and has a similar objective to the slow speed areas through adjacent villages (eg. Uki). The proposed large roundabout can achieve the appropriate speed reduction without significant impediment to through traffic on Kyogle Road. This concept has been discussed with officers of Tweed Shire Council and they are generally supportive of this notion.

The second access (Access B) will be an unsignalised T-junction with a right turning lane for traffic from Kyogle Road.

5.2 Intersection Capacity Analysis

The peak hour intersection capacity analysis has been undertaken using the aaSIDRA computer package. Analysis of the two intersections on Kyogle Road has been undertaken in order to understand the impact of the proposed development. Both intersections have been analysed in their current and proposed configuration with development traffic using the aaSIDRA computer program.

For unsignalised intersections, the maximum desirable Degree of Saturation (DOS) is 0.80 as suggested by AUSTROADS. Similarly, a maximum degree of saturation of 0.85 is adopted for a roundabout. A degree of saturation of 1.0 indicates that the intersection has reached it's maximum theoretical capacity, and there would be limitations on the operation of the intersection. The maximum degree of saturation for the two intersections with development traffic is reported in Table 5.1 below.

Table 5.1 ***Intersection Analysis Results with Proposed Layout***

Intersection	DOS (2027 Peak Hour with Development)	
	AM	PM
Kyogle Road / Access Road A (T Junction)	0.16	0.12
Kyogle Road / Mebbin Springs / Access Road A (Roundabout)	0.20	0.20
Kyogle Road / Access Road B (T Junction)	0.18	0.13

In 2027 with the proposed developments, the two intersections will operate with adequate capacity in the current and proposed configurations, during both the AM and PM peaks.

The analysis results indicate that all intersection configurations have a degree of saturation less than the desirable maximum of 0.80 or 0.85 for the respective type of intersection. As such, adequate capacity is achievable.

5.3 Daily traffic Volumes

Using the traffic volume spreadsheets the total daily volume generated by the development at the access points is as follows:

- Access A (Western Access) - two way daily total = 1,802vpd;
- Access B (Eastern Access) – two way daily total = 2,704vpd.

It is recognised that these totals do not include some of the trips generated internally within the site. Nonetheless, it is concluded that all roadways within the site are expected to have a daily volume of less than 3,000vpd. The latter is accepted as the maximum volume tolerable for reasonable amenity on a residential street. As such, the daily volumes are considered acceptable.

5.4 Intersection Sight Distance

An assessment has been undertaken of the sight distance requirement at each of the two proposed access intersections on Kyogle Road. The speed limit on Kyogle Road is not posted other than an open speed limit sign. Based on a design speed of 100km/h, the following minimum sight distance is required to satisfy Austroads 'Guide to Traffic Engineering Practice, Part 5, Intersections at Grade':

- approach sight distance (ASD) from Kyogle Road to the access – minimum 157m, desirable 170m;
- safe intersection sight distance (SISD) from access point to Kyogle Road – minimum 240m, desirable 253m.

At the western access intersection (i.e. the existing intersection opposite Mebbin Springs) the ASD is greater than 200m from both directions. The SISD from this intersection to the east is greater than 250m and to the west is approximately 200m. With some vegetation clearing in the road reserve, the latter sight distance would be greater than 300m. Note that with construction of the recommended roundabout these sight distance criteria become irrelevant and a new set of criteria will be necessary for the roundabout. Whilst such criteria will be assessed at the time of further design of the roundabout, we are confident that there will be no limitations to achieving satisfactory sight distance.



At the eastern access intersection (as proposed) the ASD is greater that 200m from the west and is approximately 100m from the east. The latter can easily be increased to 200m with clearing of some vegetation on the subject site and road reserve. The SISD to the west is currently greater than 400m and to the east is approximately 100m. With vegetation clearing on the subject site and road reserve the latter could be greater than 250m.

Based on these field measurements, it is concluded that safe sight distances are achievable with the proposed intersection locations.

Note that the sight distance assessment is based on a 100km/h speed limit. Given the 'village' designation of the subject site, it is anticipated that the speed limit on Kyogle Road would be reduced to 80km/h (at least) or possibly 60km/h adjacent to the site. Accordingly, the minimum sight distance criteria would be reduced.

Given the recommended roundabout at Access A, and the village designation of the site, it is suggested that the speed limit on Kyogle Road should be reduced to:

- 60km/h through the roundabout and the Access B junction – both junctions should be designed with a design speed of 80km/h given the prevailing speeds;
- 80km/h prior to and after the two site access intersections – approximately 1-2km away from each junction;
- retention of the existing open speed limit (or 100km/h) beyond the 80km/h limit.

Given the function of Kyogle Road and the proposed function of the two access intersections, it is suggested that the proposed eastern junction on Kyogle Road (Access B) should include dedicated turning lanes (left and right) from Kyogle Road into the site. The latter would reduce the disruption to through traffic (on Kyogle Road) caused by turning traffic (to the site).



6.0 COST CONTRIBUTION

6.1 TRCP Calculation

The Tweed Shire Council has developed the Tweed Road Contribution Plan CP No. 4, Version 4.8 (TRCP) whereby each new development pays a financial contribution according to the amount of traffic generated by the development. The contribution is required to enable the local authority to fund the construction of road infrastructure to which all developments contribute. The contributions and works are directed towards the external road network and impacts, not the internal road network that would be provided by the applicant or developer in each case.

The daily trip rates used to calculate the cost contribution are as detailed in Council's Tweed Road Contribution Plan. It must be recognised that the subject application is only to create three management lots (at this time) hence the initial TRCP is based only on three lots. At the time of the subsequent applications for each of the master plan components, the TRCP for that component will be determined. The latter calculations will take consideration of the following:

- reduced trip generation externally due to internal trip attractions and internal trips;
- reduced trip generation due to cross usage of facilities on site;
- appropriate credits to the applicant as a result of the applicant constructing public roadways within the site.

Under the TRCP, the contribution rate applicable for this area (Sector 13) is $2,405.55 per vehicle per day (vpd). This amount is based on the following information and calculation formula:

- standard trip end cost = $2,232 per vpd;
- interest trip end cost = $59 per vpd;
- administration factor = 1.05;
- Total Trip End Cost = $2,405.55 per vehicle per day (vpd).

The TRCP contribution for the subject application (three management lots) is therefore $32,474.93 (4.5vpd per household x 3 lots x $2,405.55).



7.0 CAR PARK ASSESSMENT

Parking provisions for the village are to be made by a combination of the following components:

- private parking within selected development sites;
- public off street parking within selected development sites;
- public on street parking within the private street system;
- public off street parking within a number of dedicated car parks throughout the site;
- public off street parking within the dedicated car park between Tweed River and the Kyogle Road.

The objective of the development proposal is to encourage visitors to park in the off street public car parks and walk to and within the village centre, thereby reducing traffic movements in the village.

Details of parking within each of the components of the development will be better defined at each stage of development however the overall provision in total shall meet the Tweed Shire Council parking requirements. These requirements are summarised in Table 7.1 for each of the respective uses (recognising that the master plan is indicative at this stage).

Table 7.1 ***Car Parking Requirements***

Land Use	Floor space/no. of dwellings	Council DCP2 Parking Rate	Parking Space Requirement	Proposed Provision
1. Residential – Lots	210 dwellings	1/dwelling plus provision for driveway parking	210	Minimum of 1.0 space to be provided on each individual lot, and on street parking allowed (where achievable) for visitors
2. Residential - Units – Medium/Mixed	45 units	1.5/dwelling	45 + 23*	Minimum of 1.0 car space per unit to be provided on each unit site with visitor parking provided in adjacent public car parking areas
3. Residential - Units – Medium/Mixed	23 units	1.5/dwelling	23 + 12*	Minimum of 1.0 car space per unit to be provided on each unit site with visitor parking provided in adjacent public car parking areas



Table cont...

4. Residential - Units – Medium/Mixed	22 units	1.5/dwelling	22 + 11*	Minimum of 1.0 car space per unit to be provided on each unit site with visitor parking provided in adjacent public car parking areas
5. Residential - Townhouses	120 units	1.5/dwelling	120 + 60*	Minimum of 1.0 car space per townhouse to be provided on each site with visitor parking provided in adjacent public car parking areas
6. Commercial – Hotel	50 rooms	0.5/staff plus 1/unit + 1/15sq.m GFA restaurant open to the public	10* + 50 + 10*	Minimum of 1.0 space per room provided on site, staff (assume 20 staff) and restaurant (assume 150sq.m) parking provided in public parking areas
7. Mixed Use - Workshops	700sq.m GFA	1/40sq.m for staff + 1/100sq.m	18* + 7*	All parking to be provided in public car parking areas
8. Mixed Use – Retail	1000sq.m GFA	0.5/100sq.m GFA staff plus 3.5/100sq.m GFA customer	5* + 35*	All parking to be provided in public car parking areas
9a. Mixed Use – Convention Centre	1,500sq.m GFA	0.5/staff plus 1/3 seats or 1/7m2 dining area	10* + 50	Guest parking (assume 150 seats) provided on site, staff parking (assume 20 staff) provided in public parking areas
9b. Mixed Use - Backpackers	100 beds	0.5/staff plus 1/5 beds or 1/10 beds if shuttle bus permanently utilised	5* + 20	Guest parking (assume 100 beds) provided on site, staff parking (assume 10 staff) provided in public parking areas
10. Health Space	400m2 GFA	0.5/staff plus 6/100m2 GFA customer	5* + 24*	All parking to be provided in public car parking areas
TOTAL			235*	* parking provided in public car parking areas

The Council parking requirements and the proposed arrangements for public/private and on/off street parking (as outlined in Table 7.1) are such that a minimum total of 235 public car parking spaces are required on site (see discussion below), in addition to the identified requirements for on site parking at the following facilities:

- residential lots – 1 space per lot;
- residential units – 1 space per unit;
- townhouses – 1 space per unit;
- hotel – 50 guest spaces;
- convention centre – 50 guest spaces (see note below);
- backpackers – 20 guest spaces.

Given the anticipated cross usage between the hotel and the convention centre, a relaxation in the number of guest spaces provided at the convention centre is considered appropriate. A relaxation of up to 50% would not be unreasonable.

Of the requirement projected for 235 public car spaces it is recognised that there will be some cross usage between many of the non-residential facilities. Such cross usage would result in a lesser demand and a relaxation of up to 20% of these total spaces is considered reasonable. Note that Council's "DCP No. 2 – Site Access and Parking Code" suggests that such relaxation could be as high as 30% for customer car parking.

Based on the indicative site planning it is anticipated that the site can yield approximately 200 public off street car spaces and would therefore satisfy the Council requirements.

Note that service vehicle parking requirements are expected to be met by dedicated bays on specific sites (i.e. hotel, convention centre, backpackers, health space) and by on street provisions within the private street network (for retail, mixed use).



8.0 ROAD AND PATHWAY NETWORK

8.1 Road Cross Sections

The Tweed Shire Council DCP 16 has been used as the basis for developing the proposed cross sections for the public roadways within the development site. Note that a number of private roadways will also be developed as part of each master plan component but this will be the subject of future applications. For the subject application (ie. the three management lots) the following road cross sections are proposed in accordance with Council's standards for road design:

- neighbourhood connector streets – 11m wide pavement (maximum) within an 18m wide road reserve – to connect from each access point on Kyogle Road to the central village connector street;
- central village connector street – 9m wide pavement (maximum) within a 17m wide road reserve – the east west connector street through the village centre connecting between each of the neighbourhood connector streets;
- access street – 7.5m wide pavement (maximum) within a 14.5m wide road reserve – to connect from the central village connector street beyond the western boundary of the site.

Note that the above street widths are proposed as the maximum street widths. In many cases a lesser width will be proposed where no kerbside parking is required. The lesser street width is a key component of the village atmosphere where the road reserve is to be predominantly used for pedestrian/cyclist and open space or outdoor dining/use areas. The Council road reserve widths are to be retained in these areas and the verge/footpath width increased in those locations where the road pavement width is reduced.

For the neighbourhood connector streets and the central village connector street, the proposed road form is to accommodate a bus route (future provision). Within the village site the speed limit on all roadways is intended to be no greater than 40km/h.

8.2 Pedestrian/Cyclist Pathways

A significant network of pedestrian and bicycle pathways is proposed throughout the entire site. This network provides connections within and between the management lots. The network provides easy pedestrian connections between all proposed sites and the village centre and between the main entry car park (and other car parks) and the village centre. This network is considered appropriate and desirable to meet the non motorised mobility needs of the development and will facilitate the village objective of minimising car usage.

Appendix A

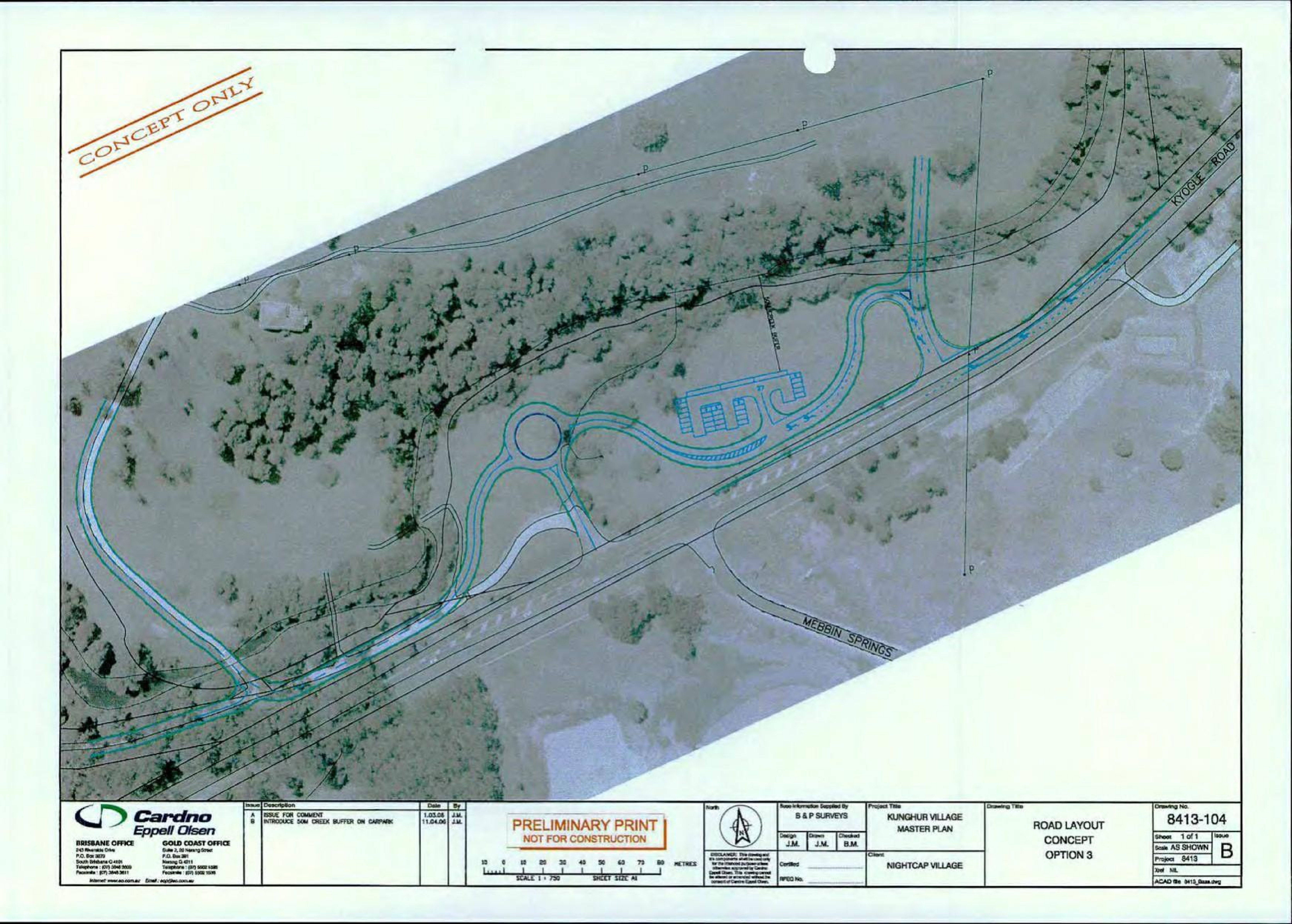
Master Plan of Development

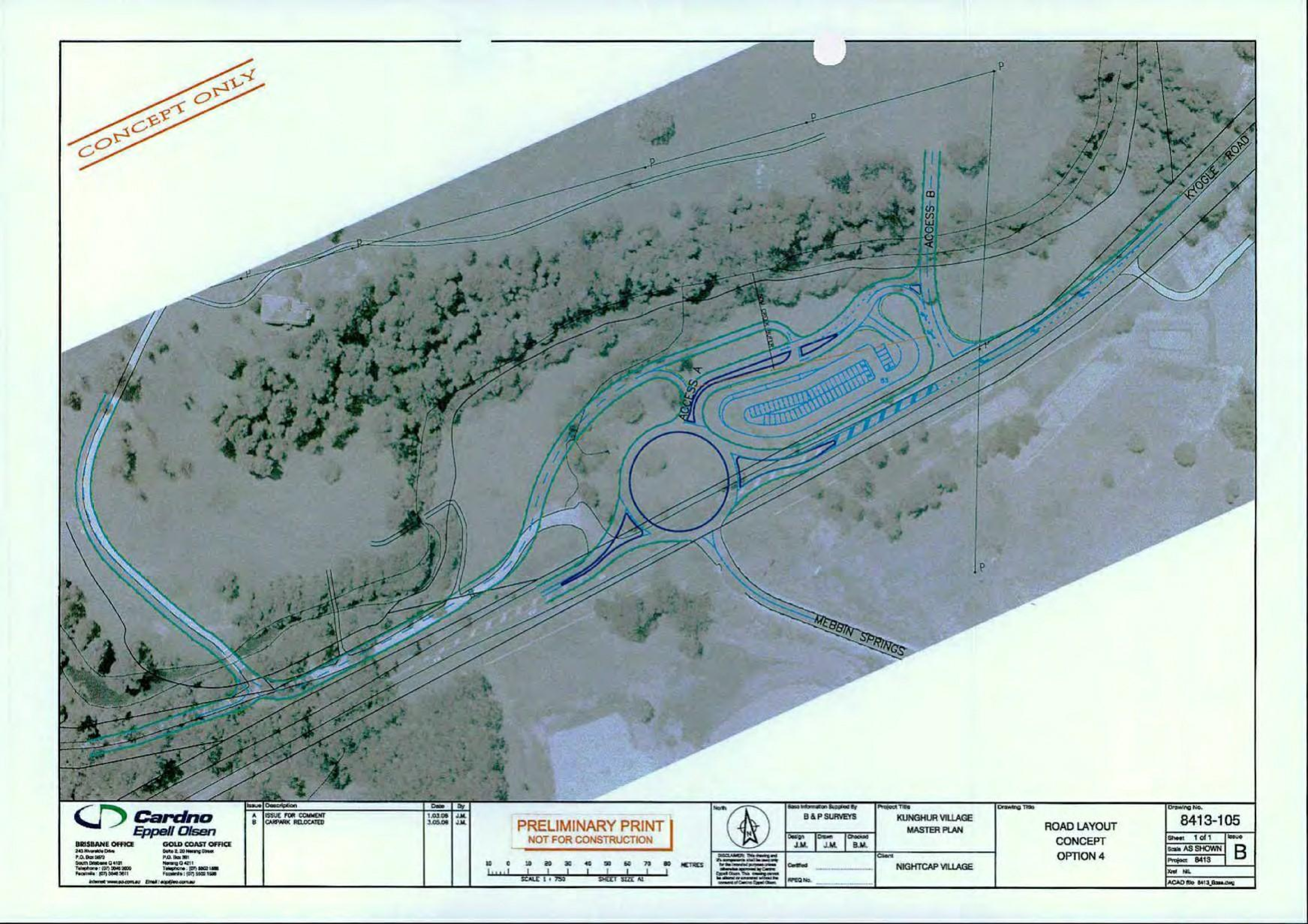


CONCEPT PLAN A

Appendix B

Proposed Access Concept


CONCEPT ONLY
KYOGLE ROAD
MEBBIN SPRINGS
Cardno
Eppell Olsen
BRISBANE OFFICE
GOLD COAST OFFICE
Issue Description Date By
A ISSUE FOR COMMENT 1.03.06 J.M.
B INTRODUCE 50M CREEK BUFFER ON CARPARK 11.04.06 J.M.
PRELIMINARY PRINT
NOT FOR CONSTRUCTION
10 0 10 20 30 40 50 60 70 80 METRES
SCALE 1 : 750
SHEET SIZE A1
North
B & P SURVEYS
Design J.M.
Drawn J.M.
Checked B.M.
Certified
RPEQ No.
Project Title
KUNGHUR VILLAGE
MASTER PLAN
Client
NIGHTCAP VILLAGE
Drawing Title
ROAD LAYOUT
CONCEPT
OPTION 3
Drawing No.
8413-104
Sheet 1 of 1
Scale AS SHOWN
Project 8413
Issue
B
Xref NIL


CONCEPT ONLY
ACCESS B
ACCESS A
KYOGLE ROAD
MEBBIN SPRINGS
Cardno
Eppell Olsen
BRISBANE OFFICE
GOLD COAST OFFICE
Issue Description Date By
A ISSUE FOR COMMENT 1.03.08 J.M.
B CARPARK RELOCATED 3.05.08 J.M.
PRELIMINARY PRINT
NOT FOR CONSTRUCTION
10 0 10 20 30 40 50 60 70 80 METRES
SCALE 1 : 750
SHEET SIZE A1
North
Base Information Supplied By
B & P SURVEYS
Design J.M.
Drawn J.M.
Checked B.M.
Certified
RPEQ No.
Project Title
KUNGHUR VILLAGE
MASTER PLAN
Client
NIGHTCAP VILLAGE
Drawing Title
ROAD LAYOUT
CONCEPT
OPTION 4
Drawing No.
8413-105
Sheet 1 of 1
Issue B
Scale AS SHOWN
Project 8413
Xref NIL
ACAD file 8413_Base.dwg

Appendix C

Traffic Volume Spreadsheets

Cardno
Eppell Olsen

Kunghur Village - TRCP Traffic Generation Rates **Table C**

Lot Use	Size	Unit	Modification factor (TRCP Table 7.2)*	Cross use reduction	Internal use reduction	Generation Rate TRCP Table 7.1 (vpd)	daily traffic volume (vpd)	conribution rate ($/vpd)	Total Contribution ($)
1. Residential - Lots (100%)	210	dwelling	1.00	0%	20%	6.5	1092	$2,406	$2,626,861
2. Residential - Units - Medium / Mixed (50%)	45	dwelling	1.00	0%	20%	3.9	140	$2,406	$337,739
3. Residential - Units - Medium / Mixed (25%)	23	dwelling	1.00	0%	20%	3.9	72	$2,406	$172,622
4. Residential - Units - Medium / Mixed (25%)	22	dwelling	1.00	0%	20%	3.9	69	$2,406	$165,117
5. Residential - Units - Townhouses (100%)	120	dwelling	1.00	0%	20%	3.9	374	$2,406	$900,638
6. Commercial - Hotel (100%)	50	rooms	1.00	0%	30%	5	175	$2,406	$420,971
7. Mixed Use - Workshops - 50 people employed	700	100m2 GFA	1.00	20%	20%	16	72	$2,406	$172,430
8. Mixed Use - Retail	1000	100m2 GFA	1.00	20%	20%	TRCP eqtn**	640	$2,406	$1,539,552
9a. Mixed Use - Convention Centre	1500	100m2 GFA	1.00	20%	30%	50	420	$2,406	$1,010,331
9b. Mixed Use - Backpackers	100	beds	1.00	0%	30%	2.48	174	$2,406	$417,603
10. Health Space	400	100m2 GFA	1.00	20%	20%	50	128	$2,406	$307,910
11. Green Space (Village Green)	1	number	1.00	0%	0%	100	-	-	-
12. Green Space (Sports Display)	1	number	1.00	0%	0%	100	-	-	-
13. Green Space (Market Garden)	1	number	1.00	0%	0%	100	-	-	-
14. Car Park	50	car spaces	1.00	100%	0%	20	-	-	-
15. Car Park	50	car spaces	1.00	100%	0%	20	-	-	-
16. Car Park	50	car spaces	1.00	100%	0%	20	-	-	-
17. Car Park	50	car spaces	1.00	100%	0%	20	-	-	-
18. Existing Road to Mount Warning (camping ground)	1	number	1.00	0%	20%	50	-	-	-
19. Existing Old Road	1	number	1.00	0%	20%	50	-	-	-
						Total:	**3355**		**$8,071,775**

* A valueof 1.0 is used for no modification
** Retail generation = 200 + 0.8xGLA

Standard Contribution Calcs

Standard Trip End Cost	$2,232.00
Interest Trip End Cost	$59.00
Administration factor	1.05
Total Trip End Cost	$2,405.55